Configuration Control and Audit Assembly

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DSN Data Systems Section

The Configuration Control and Audit Assembly (CCA) Project is responsible for the implementation of a computer-based system for acquiring, managing and distributing a subset of the Deep Space Network (DSN) Data Base of operational and management information. This system is presently scheduled for transfer to Operations July 1, 1981. Early in 1978 a demonstration will be conducted to provide data for a Life Cycle Cost (LCC) Analysis and verify design feasibility.

I. Introduction

This report presents an overview of the functions of the Configuration Control and Audit Assembly (CCA) and describes the subset of those functions that will be included in the CCA Demonstration to be performed at the Goldstone Deep Space Communications Complex (DSCC) early next year.

II. CCA Overview

The CCA is a unit in a network of four computers which is comprised of a CCA each at the Jet Propulsion Laboratory (JPL), Australia Deep Space Communications Complex (DSCC), Spain DSCC and Goldstone DSCC and linked together by high-speed data (HSD) lines (Fig. 1).

The CCA will perform the following major functions:

(1) Data acquisition

(2) Data management

(3) Data distribution

Its two primary objectives are:

(1) Provide an easily accessible source of valid information to support DSN management activities.

(2) Provide a more cost effective method of acquiring, maintaining and retrieving managerial data.

III. Hardware

The CCA hardware configuration consists of the following: (Fig. 2)

(1) One MODCOMP central processor, 64K word core memory

(2) One 25.0 million byte (MB) disc

(3) One 2.5 MB disc

(4) One Magnetic Tape Unit

(5) Remote Terminals

(6) Operations Console

During the demonstration a Telemetry Process Assembly (TPA) at Compatibility Test Area (CTA) 21 will be used as a CCA. The demonstration configuration at the Goldstone DSCC will include additional peripherals (Figs. 3 and 4).

IV. Data Base

The DSN Data Base is a collection of stored operational data shared by the DSN personnel who periodically retrieve, update, add, and delete data. The DSN Data Base resides on various storage media and is maintained via various computerized and manual data management systems (Fig. 5). The CCA is concerned with those computerized portions of the data base applicable to station operations. The CCA demonstration will deal with a restricted subset of data comprising the physical equipment category (Fig. 6).

V. Demonstration Purpose

The primary purposes of the CCA Assembly demonstration are:

(1) To provide valid cost data for a Life Cycle Cost (LCC) comparison analysis in order to establish economic feasibility.

(2) To verify in an operational environment the functionality of a DSN distributed data base design.

(3) To verify selected CCA Assembly requirements and the resulting technical design in an operational environment.

VI. Demonstration Software

The CCA system software supports two modes of operation:

(1) On-line

(2) Off-line (Fig. 3).

A. On-line

On-line operations fall into three major categories:

(1) Transactions

(2) Inquiries

(3) MBASIC* applications programs

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*A trademark of the California Institute of Technology.

Transactions are operations performed to request changes to the data base. Those transactions that will be available to the user during the demonstration are:

(1) Indicate equipment is to be shipped

(2) Enter a new equipment Engineering Change Order (ECO)

(3) Up-dating ECO status

(4) Indicate equipment has failed

(5) Assign a new control number

(6) Receive shipment

(7) Enter a new equipment design

(8) Assign nomenclature to a drawing number

Inquiries are operations that retrieve information from the data base. Those transactions that will be available to the user during the demonstration are:

(1) Request location of a possible spare

(2) Request ECO status by drawing number

(3) Request ECO status by DSN control number

An MBASIC* processor is being developed to allow application programs to access the data base in an information retrieval mode.

B. Off-line

Off-line operations fall into two major categories:

(1) Update

(2) High Speed Data (HSD)

The update portion of the off-line software takes care of all manipulations to the data base. Transactions from the transaction file are supplied to the data base after the "old" base is achieved. A new master data base is now formed as the result of transactions (Fig. 7).

The HSD portion of the off-line software handles transmissions between the CCA at the Goldstone DSCC and CTA-21. Any file selected by the operator may be transmitted in either direction.

VII. Analysis

During the demonstration a series of monthly management reports will be generated by DSN Facility Support and Goldstone Operations. The monthly report will cover the following:

(1) Overview of demonstration operations and progress

(2) Significant problems

(3) Data base comparison sampling results

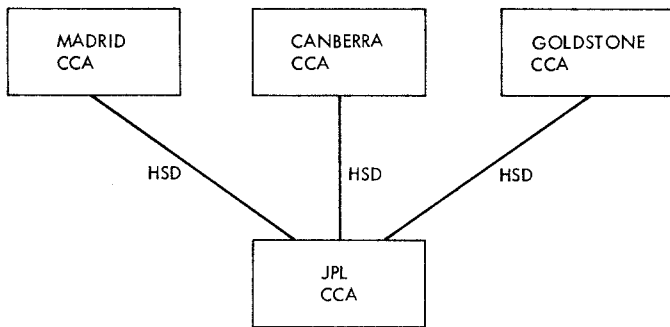The Life Cycle Cost (LCC) Analysis will be based primarily on this data.

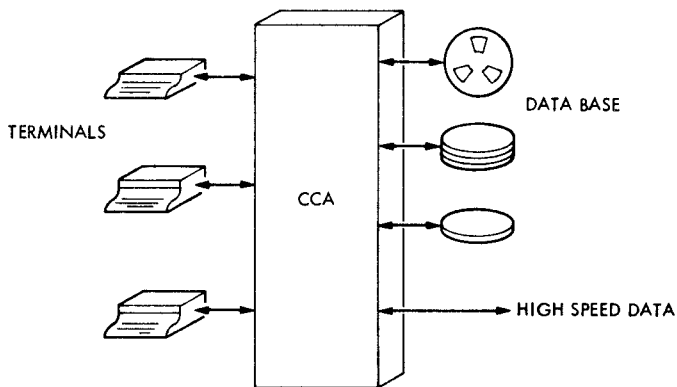**Fig. 1. Overview of the CCA configuration**
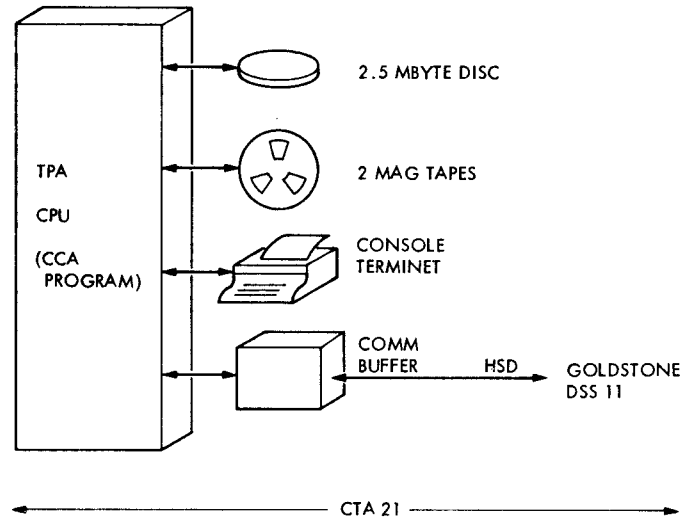

Fig. 2. CCA hardware configuration

Fig. 3. CCA demonstration hardware at CTA 21

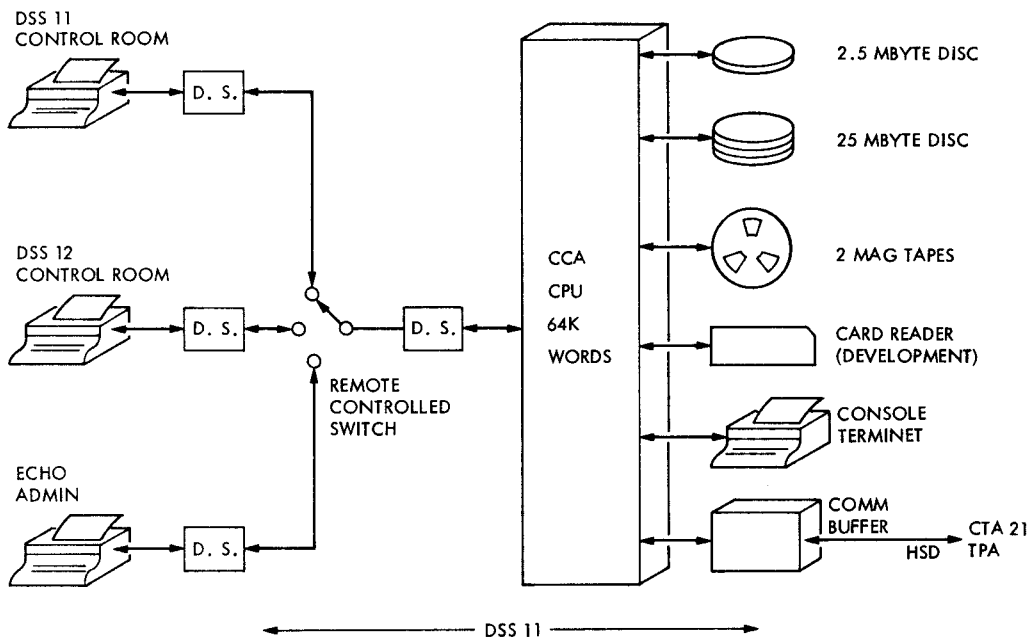**Fig. 4. CCA demonstration hardware at Goldstone**

TOP LEVEL
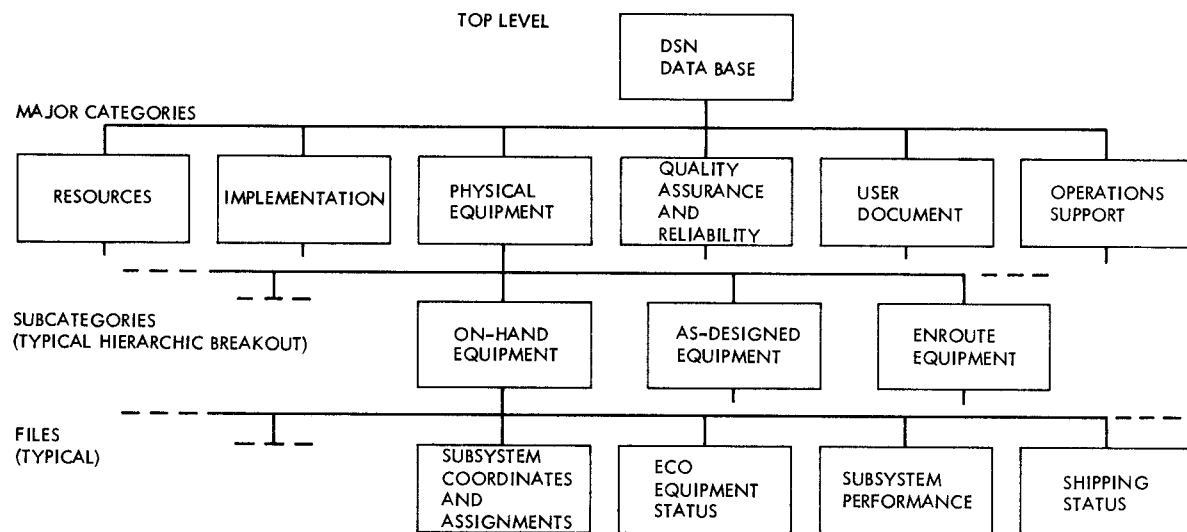
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                                    ┌──────────────┐
                                    │ DSN          │
                                    │ DATA BASE    │
                                    └──────┬───────┘
MAJOR CATEGORIES
   ┌──────────┬──────────────┬───────────┼──────────────┬──────────────┬──────────────┐
┌─────────┐┌──────────────┐┌──────────┐┌──────────┐┌──────────┐┌──────────────┐
│RESOURCES││IMPLEMENTATION││PHYSICAL  ││QUALITY   ││USER      ││OPERATIONS    │
│         ││              ││EQUIPMENT ││ASSURANCE ││DOCUMENT  ││SUPPORT       │
│         ││              ││          ││AND       ││          ││              │
│         ││              ││          ││RELIABILITY││         ││              │
└─────────┘└──────────────┘└────┬─────┘└──────────┘└──────────┘└──────────────┘
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SUBCATEGORIES
(TYPICAL HIERARCHIC BREAKOUT)

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              ┌──────────────┬──────────────┬──────────────┐
          ┌──────────┐┌──────────────┐┌──────────────┐
          │ON-HAND   ││AS-DESIGNED   ││ENROUTE       │
          │EQUIPMENT ││EQUIPMENT     ││EQUIPMENT     │
          └────┬─────┘└──────────────┘└──────────────┘
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FILES
(TYPICAL)

```
          ┌──────────────┬──────────────┬──────────────┐
     ┌──────────────┐┌──────────┐┌──────────────┐┌──────────┐
     │SUBSYSTEM     ││ECO       ││SUBSYSTEM     ││SHIPPING  │
     │COORDINATES   ││EQUIPMENT ││PERFORMANCE   ││STATUS    │
     │AND           ││STATUS    ││              ││          │
     │ASSIGNMENTS   ││          ││              ││          │
     └──────────────┘└──────────┘└──────────────┘└──────────┘
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Fig. 5. The DSN data base


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                    ┌─────┐
                    │ DSN │
                    └──┬──┘        DEEP SPACE NETWORK
   ┬──────┬──────┬─────┤          OPERATION DATA BASE
OTHER CATEGORIES
                    ┌─────┐
                    │ PPT │        PHYSICAL PLANT AND
                    └──┬──┘        TAGGED EQUIPMENT
        ┌──────────────┼──────────────┐
     ┌──────┐      ┌──────┐      ┌──────┐
     │ ONHA │      │ ASDE │      │ ENRO │
     └──────┘      └──────┘      └──────┘
   ON-HAND        AS-DESIGN       ENROUTE
   EQUIPMENT      EQUIPMENT       EQUIPMENT
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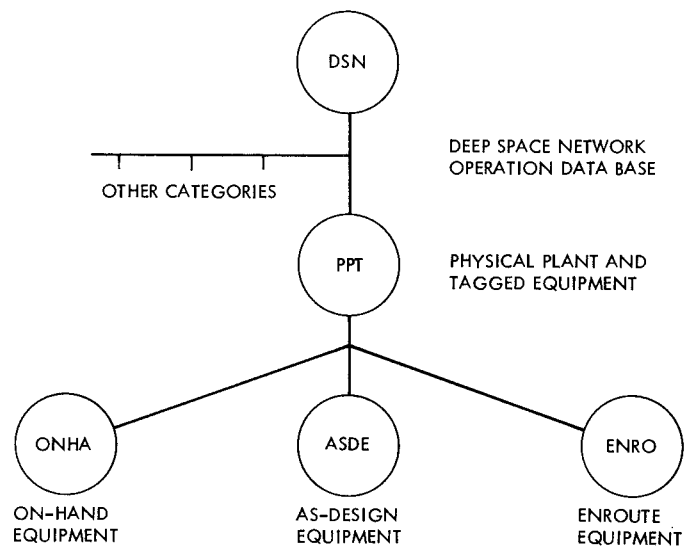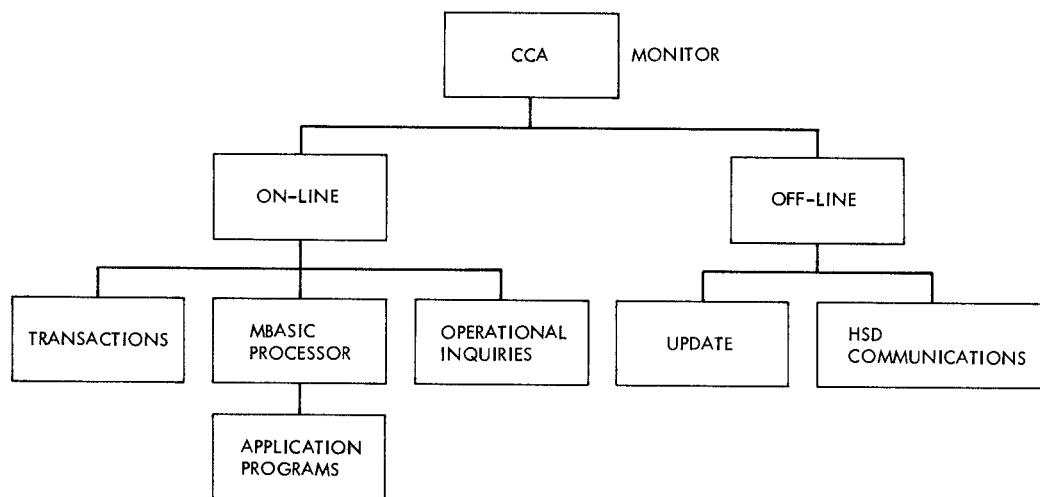
Fig. 6. The CCA demonstration data base

170

Fig. 7. Overview of CCA demonstration software